

Evaluation of Information on Wild Berry and Mushroom Markets in European Countries

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Abstract The income-generating dimension of berry and mushroom picking is important in many European countries or regions of countries, predominantly for rural livelihoods. Due to the role and economic potential in the utilization of non-wood forest products (NWFPs), there is a need, and also an increasing interest in, monitoring their market volume and values both at national and international levels. There is a wealth of information from different sources at the national level, but at the international level there is a need to harmonize the information. It is a major challenge for international data collection efforts to balance the need for harmonization of statistics without losing interesting information. This paper presents and analyses statistics on the quantity and value of two groups of marketed NWFPs: (1) mushrooms and truffles, and (2) fruits, berries and edible nuts. The statistics came from the *State of Europe's Forests 2007* report and its country reports. Our paper describes the shortcomings of the statistics and identifies potential explanations for the limitations. The results from this study reveal that the usability of data on marketed mushrooms and berries varies a lot between countries. In general, the data are incomplete and not comparable among countries. Another challenge is the consistency of information on production, trade and consumption flows. Based on a Finnish example, balance sheets can be used to control the consistency and derive missing sub-components of trade flows. A regional case study of Nordic and Baltic countries and the Russian Federation illustrates potential from national household and operator surveys for complementary information.

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Introduction

Picking wild berries and mushrooms is one of the oldest forest customs and has maintained its popularity in many European countries, as shown by the recent study by Seeland and Staniszewski (2006, 2007) (see Table 1). Substantial amounts of berries and mushrooms are collected for self-consumption, but subsistence needs of the past have largely been replaced by recreational motives. Still, the income-generating dimension of berry and mushroom picking is also very important in many countries or regions of countries (predominantly for rural livelihoods). In addition, there is a growing demand for “natural”, or organic, products which in

Table 1 Significance and monetary benefit of berries/fruits and mushrooms in 14 European countries according to the study of Seeland and Staniszewski (2006, 2007)

Country	Significant importance		Monetary benefit	
	Berries/fruits	Mushrooms	Berries/fruits	Mushrooms
Austria	N ^a	N ^a	Y	Y
Bulgaria	Y	Y	Y	Y
Croatia	Y	Y	?	Y
Denmark	N	N		
Finland	Y	Y	Y	Y
Hungary	N	Y ^b		Y
Ireland	N	N		
Italy	N ^c	Y		Y
Lithuania	Y	Y	Y	Y
Norway	Y	Y	Y	N
Poland	Y	Y	Y	Y
Romania	Y	Y	Y	Y
Switzerland	N ^a	Y	Y	Y
United Kingdom	Y?	N	?	

Y yes, N no

Significance: provides an overall assessment whether a NWFP or NWFS in question is nowadays important in the general national context of forest use (if compared to many other NWFP&S)

Monetary benefit: denotes whether there is a substantial cash flow connected to the NWFP or NWFS in question

Assessments based on data available through COST Action E30 country reports; see e.g. Seeland and Staniszewski (2007, p. 413)

? not clear on the basis of the COST Action E30 country report

^a If compared to, e.g., recreation, forest education or nature conservation

^b “Trend product”, great importance in private sector

^c Collection of berries is unimportant, and the role of chestnuts and hazelnuts is decreasing

turn has spurred commercial interest in products such as medicinal plants, mushrooms and many berry species (e.g. bilberries (*Vaccinium myrtillus*) because of their health effects). Many non-wood forest products (NWFPs) are relevant for urban citizens in that they provide specific lifestyle products that are in demand (e.g. truffles).

Seeland and Staniszewski (2006, 2007) examined the specific importance and role of different non-wood forest products and services (NWFP&S) in 14 European countries by developing a set of indicators. The indicators used by Seeland and Staniszewski (2006, 2007) were designed by a working group of the COST Action E30 (Economic integration of urban consumers' demand and rural forestry production) to help in the comparison and classification of NWFP&S in Europe. Table 1 presents results concerning two selected indicators (i.e. "significance", and "monetary benefit") in the case of berries/fruits and mushrooms. It indicates, among other things, that wild berries and mushrooms were regarded to have a certain economic significance by most of the countries under examination, even by many well developed societies (cf. Kangas 2001). However, it is important to consider that the items and indicators were classified according to their occurrence in the COST Action E30 country reports and no quantification of harvest was attempted (Seeland and Staniszewski 2006, 2007). Moreover, Seeland and Staniszewski (2006, 2007) stated that it was almost impossible to take into account regional and local variations concerning the importance of indicators within a country.

There is a large variation in national legislation regarding access and ownership rights of NWFPs (Bauer et al. 2004). In Finland and Sweden, where public access rights are possibly the widest in Europe, people are allowed to pick berries and mushrooms in all forest areas, and this right includes not only natives but also foreigners (e.g. Salo 1995). In fact, during recent years Swedish and Finnish wild berry companies have invited a number of foreign pickers who have been able to earn considerable sums of money (depending on annual crop level) by means of berry picking (Paassilta et al. 2009; Richards and Saastamoinen 2010). In contrast, in densely populated countries in central and southern Europe, gathering NWFPs is frequently subject to strict rules (e.g. Bauer et al. 2004). For example, there might be differences in regulation with regard to collection of NWFPs for private use versus collection for commercial use. There are also cases where the collectors have considerable rights in public forests but where collection in private forests may be prohibited without permission of the landowner. In countries like this, forest owners can earn income from NWFPs, for example, through permits for recreational collection of mushrooms (e.g. Gatto et al. 2009).

Irrespective of who receives the income from picking, wild berries and mushrooms play their part in generation of income and employment, especially in rural areas. They also have a role and economic potential for the future of the forestry sector, and rural development in general. Consequently, there is a need and an increasing interest in monitoring the market volume and values of wild berries and mushrooms, and NWFPs in general, both at national and international levels. As stated by Vantomme (2003), reliable production and trade data on NWFPs is essential to value NWFP's contribution to national economies, and for the elaboration of appropriate policies and regulations governing a sustainable

development of forests. Data should facilitate comparisons between countries, as well as monitoring of trends and changes in product demand and supply over time. Consequently, consistency is an important data quality criterion.

There are two main data collection efforts related to pan-European reporting of NWFPs. The first one is the Global Forest Resources Assessment (FRA) which is a worldwide survey undertaken by the Food and Agriculture Organization (FAO) every 5 years (see the latest assessment FRA2010 in FAO 2010). The second one is the State of Europe's Forests which collects data according to the pan-European criteria and indicators for sustainable forest management and is provided by United Nations Economic Commission for Europe (UNECE), FAO and the Ministerial Conferences on the Protection of Forests in Europe (FOREST EUROPE) (see the latest report in MCPFE/UNECE/FAO 2007). Both efforts cover the same topics, and the collected information comes principally from the same officially nominated national correspondents, or contacts. They ask for different information: FRA requests information on total harvested quantities and values, while State of Europe's Forests includes marketed products (see next chapter). However, many countries report the same figures for both data sets.

This paper analyses statistics on the quantity and value of two groups of marketed NWFPs in the *State of Europe's Forests 2007* report (MCPFE/UNECE/FAO 2007) and its country reports: (1) mushrooms and truffles, and (2) fruits, berries and edible nuts. The purpose is to analyze the usability of the European data in terms of quality of data sources, species coverage, market coverage, and basis for the value estimate. Shortcomings are outlined as well as potential explanations for the limitations. Our regional case study for Nordic and Baltic countries and the Russian Federation identifies complementary information. Finally, we make some recommendations for future data collection. Export and import statistics are not considered in this paper, except in a Finnish example on balance sheet technique used to check consistency and derive missing sub-components of trade flows.

Data on Marketed Non-Wood Goods in Europe

The *State of Europe's Forests 2007* report (later referred to as SoEF2007) covers the six pan-European criteria and 35 quantitative as well as 17 qualitative indicators for sustainable forest management. The SoEF2007 report includes 46 European countries, including the Russian Federation (see MCPFE/UNECE/FAO 2007, Annex 3). Criterion 3 "Maintenance and encouragement of productive functions of forests" includes an indicator which is directly related to marketed non-wood goods. This indicator (3.3) is titled "Non-wood goods: value and quantity of marketed non-wood goods from forests and other wooded land".¹ It is important to note that this indicator covers only non-wood goods sold on markets and excludes products harvested for self-consumption (subsistence) and other forms of uses without any market transaction. For comparison, the earlier reports on European forests (i.e. MCPFE 1998, 2003) provided estimates on the quantities and values of NWFPs in general, not separating commercial use from personal use.

¹ For the definition of forest and other wooded land, see MCPFE/UNECE/FAO (2007).

In SoEF2007, data for indicator 3.3—as well as for 22 other quantitative indicators—were collected from individual countries through questionnaires. The questionnaire contained 23 reporting forms, and typically there was one form for each indicator. Each reporting form contained a table which national correspondents were asked to fill in. The correspondents were also asked for data sources and were provided with an opportunity to add comments to the submitted data (MCPFE/UNECE/FAO 2007).

Correspondents were asked to provide quantity and value estimates for 13 categories of plant and animal products (raw material), including “mushrooms and truffles” and “fruits, berries and edible nuts”. The estimates were requested for three different years: 1990, 2000 and 2005. Products from mushroom farms, or fruits from trees outside forests such as orchards, were not taken into account. In this paper, “mushrooms” includes both mushrooms and truffles. “Berries” includes whole group “fruits, berries and edible nuts” (unless mentioned otherwise).

When developing the SoEF2007 report, data from questionnaires on quantitative indicators were compiled, checked and verified by external reviewers² in close co-operation with national correspondents, and entered into the FAO database (MCPFE/UNECE/FAO 2007). The data were subjected to checking and validation procedures to ensure completeness and consistency (see MCPFE/UNECE/FAO 2007, Annex 2). However, when reporting marketed mushrooms and berries, some criteria for usability (e.g. the quality of data source, relevance of data, variation between countries) were ignored. In general, the SoEF2007 report lacks a detailed description of the data contents, at least with respect to indicator 3.3. These issues are addressed in the next chapter.

Analysis of the European Statistics on Marketed Mushrooms and Berries

In SoEF2007, data on the quantity and value of marketed mushrooms were provided by 22 countries (Fig. 1). Two of these countries (Lithuania and Ukraine) gave only quantity estimates while all other countries gave both quantity and value estimates. Data on berries were provided by 21 countries. Of these countries, Lithuania, Switzerland and Ukraine presented only quantity estimates.

Usability of data on marketed mushrooms and berries was analyzed in detail in the case of those countries which provided estimates (Fig. 1). All information used in this analysis was drawn from country reports for SoEF2007, and only the year 2005 was considered. The following factors were examined, which were assumed to be essential:

1. Source and relevance: indicates whether the estimates were based on official regular statistics (OS), were just rough or expert estimations (EST), were not reliable (NO; for example, not concerning marketed products), or whether it

² National reports for SoEF2007 were reviewed mostly by experts from UNECE and FAO and, in addition, two experts designated by MCPFE member countries contributed to the process (Michalak, R., personal communication).



Fig. 1 Countries which provided data on marketed mushrooms and/or berries for the SoEF2007 report

was not possible to draw conclusions based on the country report (?). Thus, the quality of data sources was ranked into four different classes.

2. Species coverage: indicates whether the species in question were mentioned in the country report, or the information was missing.
3. Coverage of the markets: indicates whether the estimates considered the whole market or only a part of the market (for example, whether only trade of the biggest firms was considered).
4. Basis of the value estimate: denotes whether the country report identified prices used to estimate values.

A preliminary overview on country reports indicated that usually the same source of information was used to report on both mushrooms and berries. Therefore, source and relevance of the data on markets of these two products was made at the same time and concerned both quantity and value estimates (Table 2).

Only three countries (Finland, Lithuania, Poland) could provide data based on official statistics (Table 2). Most countries provided some sort of expert estimates; this fact was either mentioned in the country report (e.g. Albania, Italy, Switzerland) or it could be concluded otherwise (for example, for Croatia and Slovenia, the data source mentioned in the comments was from before 2005). In the case of a few countries, it was not possible to draw conclusions on the reliability of data, not even when the data source was provided (Table 2). The figures given by Czech Republic

Table 2 Source and relevance of data (including both quantity and value estimates) on marketed mushrooms and berries by country (all information drawn from country reports for SoEF2007)

Country	Reliability	Remarks ^a
Albania	EST	
Belarus	?	Source: Ministry of the Nature Resources ^b
Bulgaria	?	Source: National Forestry Board ^b
Croatia	EST	Source: Ministry of Culture, Department of Environment
Cyprus	EST	The estimates were set at zero but the country comments revealed that there was actually absence of information
Czech Republic	NO	Source: Ministry of Agriculture The information concerns collected products. There is no information on the marketed products but “it could be about 20% of collected”
Denmark	EST	The estimates were set at zero but the country comments revealed that there was actually absence of information
Finland	OS	Source: FFRI (2006) ^c
Iceland	EST	Referred to FRA2005, which in turn states that there is no data available
Italy	EST	
Lithuania	OS	Referred to FRA2005, which in turn refers to SFSS (2003) ^d
Monaco	EST	The area with tree cover is only marginal (see e.g. FRA 2005) and, therefore, the estimates “zero” may be justified (a.c.)
Norway	EST	
Poland	OS	Source: Central Statistical Office ^e
Russian Federation	?	Source: Federal Forest Agency, Federal State Unitary Enterprise “Roslesinforg” ^b
Serbia	?	
Slovakia	EST	Data was obtained from research reports, customs statistics and database of the state forest
Slovenia	EST	In the category of berries (meaning “fruits, berries and edible nuts”), only chestnuts were taken into account
Switzerland	EST	In the category of berries (meaning “fruits, berries and edible nuts”), only chestnuts were taken into account
Turkey	?	
Ukraine	?	Source: Statistical Bulletins on Felling and Delivery of Timber and Other Forest Resources ^b The category of berries (meaning “fruits, berries and edible nuts”) includes also tree sap
United Kingdom	EST	

In the analysis, only those countries which provided estimates for the year 2005 have been considered (cf. Fig. 1)

Source and relevance: indicates whether the estimates were based on official regular statistics (OS), were just rough or expert estimations (EST), were not reliable (NO; for example, not concerning marketed products), or the information could not be concluded on the basis of the country report (?)

^a In the remarks, the data source or other valid information has been given if provided in the country report (in one case, author’s comment (a.c.) has been added)

^b The data source was not easily found, e.g. from internet, and therefore, conclusions about the reliability of data could not be made

^c The statistics considers companies dealing in wild berries and mushrooms (so-called organized trade). A major part of outdoor market trade is not included in the figures

^d In general, official statistics but see the footnote of Table 3

^e The statistics include only official trade organized in special places on a large scale (purchased products are meant for the use of big companies). It does not include direct trade to e.g. kitchens or sales on the roadside or in market places (i.e. unorganized trade)

did not consider only marketed products but the total harvest. However, this important information was not taken into account in the SoEF2007 report.

The basis of value estimates was generally not provided. Only two countries (Czech Republic and Slovenia) mentioned prices used in the calculations, but the type of information provided was very general (Czech Republic: “prices on the internet” and Slovenia: “average price per 1 kg on the food market”). On the other hand, some countries (e.g. Finland) provided the specific data source, providing a description of the basis for value estimates. Similarly, berry and mushroom species were generally not mentioned in the country reports (except for clarifications given by Slovenia and Switzerland, see Table 2), but in the case of a few countries the species in question could be found by looking at the data source (e.g. Finland, Lithuania).

Only one country (Finland) mentioned in its country report that the figures provided do not cover all the markets (Table 2). Information concerning coverage of markets was missing from the other country reports, even though data were found to be incomplete also in some other cases. For example, the data source mentioned in Poland’s country report (Table 2) and a closer examination of Russia’s situation (see next chapter) revealed that the figures provided do not take into account all the markets.

Regional Case Study: Nordic and Baltic Countries and the Russian Federation

This chapter presents data on marketed mushrooms and berries that can be found in Nordic and Baltic countries and in the Russian Federation (Table 3). This chapter also describes the contents of the data. The information presented in Table 3 was mainly drawn from the SoEF2007 report and respective country reports (Denmark, Finland, Iceland, Norway, Lithuania, Russian Federation). When necessary, national correspondents were asked to provide clarification. In the case of countries which did not provide data for the SoEF2007 report (Sweden, Estonia, Latvia), an attempt was made to find the information from various sources (e.g. national official statistics, national studies, country reports for FRA2005 and FRA2010, personal communication). In Table 3, most of the data refer to year 2005, except for data concerning Sweden and Estonia.

In general, there is a strong tradition in berry and/or mushroom picking in the nine countries selected for a closer examination (see Table 1, also e.g. Salo 1995; Paal and Saastamoinen 1998; Vilkriste 1998; Pouta et al. 2006; Richards and Saastamoinen 2010), except for Denmark and Iceland. The economic significance of these NWFPs, reflected at least to some extent by the indicator “Monetary benefit” in Table 1, seems to vary a bit more among these countries. This chapter provides also some additional background information to that presented in Table 1, especially for countries not included in the table.

Finland has extensive data on trade in wild berries and edible mushrooms. Statistics on annual quantities and values of berries and mushrooms bought by organized trade and industry (i.e. companies dealing in wild berries and mushrooms) have been compiled since 1977, first by the Market Research Institute

Table 3 Quantity and value of marketed mushrooms and berries in the Nordic and Baltic countries and the Russian Federation in 2005 (MCPFE/UNECE/FAO 2007)

Country	Mushrooms		Berries		Mushrooms and berries	
	Quantity (tonnes)	Value (€1,000)	Quantity (tonnes)	Value (€1,000)	Quantity (tonnes)	Value (€1,000)
Denmark	0	0	0	0	0	0
Finland ^a	426	1,019	12,027	11,862	12,453	12,881
Iceland	0	0	0	0	0	0
Norway	500	1,873	350	524	850	2,397
Sweden			13,790^b			32,435^c
Estonia ^d	192	259	780	527	972	786
Latvia						
Lithuania ^c	2,242 (2,303)	(9,606)	1,558 (939)	(2,722)	3,800 (3,242)	(12,328)
Russian Federation	65	87	263	40	328	127

When no figures were available in the SoEF2007 report, complementary information has been searched for (in bold). In this case, the reporting year varies by country

^a Original data source: Food and Farm Facts Ltd. (see also FFRI 2006)

^b Source: Jonsson and Uddstål (2002). The reference year is 2000

^c Source: Statistics Sweden (figure included in output of agriculture in the national accounts). The reference year is 2005. An average exchange rate for this year has been applied

^d Source: Paal and Saastamoinen (1998). The reference year is 1994. An average exchange rate for this year has been applied

^e Original data source: SFSS (2003). Figures presented in SoEF2007 for the year 2005 were estimated by extrapolating the data of 2000 and 2003. Therefore, the figures which describe the actual situation in 2005 have also been given (in parentheses; see, e.g., the country report for FRA2010). An average exchange rate for the year has been applied

of Pellervo Society (e.g. Malin 1992) and later by Food and Farm Facts Ltd. (e.g. Maa-ja metsätalousministeriö 2010). There are trend data for bilberry, cowberry (*Vaccinium vitis-idaea*) and cloudberry (*Rubus chamaemorus*). For other berry species, including crowberry (*Empetrum nigrum*), cranberry (*Vaccinium oxycoccos*), sea buckthorn (*Hippophae rhamnoides*), arctic bramble (*Rubus arcticus*) and raspberry (*Rubus idaeus*), the data are not as extensive. There are trend data from 1977 for mushrooms, including ceps (*Boletus* spp.), milk caps (*Lactarius* spp.) and chanterelles (*Cantharellus cibarius*), while for other species (e.g. *Gyromitra esculenta*, *Cantharellus infundibuliformis*, *Craterellus cornucopioides*) the data are available for shorter time periods. Values were estimated using the market price for collectors, or first point of sales value (Table 3).

It is important to note that Finnish trade statistics do not include direct trade, e.g. to kitchens and restaurants, or retail trade in market places (i.e. unorganized trade). Therefore, a balance sheet based on national berry collection surveys in 1997 and 1998 (Saastamoinen et al. 2000) was defined to derive unorganized trade as a difference between total and organized sales (Table 4). Table 4 indicates that in 1997 and 1998 a considerable part of the bilberry and cowberry trade remained outside the official statistics (26% in 1997 and 30% in 1998). In 2005, the

Table 4 Use of bilberries and cowberries (mill. kg) in Finland in 1997 and 1998, and available statistics for the year 2005

	1997	1998	2005
Domestic production of berries	44.7 ^a	37.0 ^a	
Collection for sale	14.3 ^a	11.3 ^a	
Market supply of berries (organized trade)	10.6 ^b	7.9 ^b	11.7 ^c
Unorganized trade	3.7 ^{a,b}	3.4 ^{a,b}	
Collection for own use	30.4 ^a	25.7 ^a	
Import ^d	1.7 ^b	2.6 ^b	4.5 ^c
Export ^d	2.1 ^b	2.8 ^b	4.0 ^c
Domestic utilization of berries	44.3	36.8	

^a Source: Saastamoinen et al. (2000)

^b Source: Malin (1999)

^c Source: Maa-ja metsätalousministeriö (2007)

^d Import and export statistics include fresh and frozen bilberries, and fresh cowberries

proportion of unorganized trade was unknown because nationwide NWFP collection surveys have not been conducted since the late 1990s.

In Norway, there are no official data on NWFPs (except for hunting statistics). Therefore, estimates concerning the quantity of marketed mushrooms and berries are very rough (Table 3) based “on interviews of persons involved in commercial collection of these products” (Tomter, S., personal communication). The prices used in the value estimates are market prices for collectors, also obtained through interviews (Tomter, S., personal communication). Berry and mushroom species were not identified in the country report but generally the collection of wild berries in Norway comprises bilberries, cowberries and cloudberries and the collection of mushrooms comprises mainly ceps and chanterelles (Tomter, S., personal communication; see also country report for FRA2010).

In Sweden, the commercial collection of edible mushrooms is not very large-scale (Wichmann and Grönlund 2007). The situation is different in the case of wild berries, largely due to a high number of foreign pickers (Wichmann and Grönlund 2007). There are no official statistics for commercially picked berries or mushrooms in Sweden (Duvemo, K., personal communication), and consequently no estimates were provided for SoEF2007. However, Statistics Sweden presents annual data on the value of marketed berries and mushrooms, but it is very rough as “it is based on assumptions made on the basis of weather conditions and information gained from newspapers” (Karlsson, E., personal communication). The figures related to berries and mushrooms cannot be found in the web pages of Statistics Sweden (Karlsson, E., personal communication), but are included e.g. in the country report for FRA2010. In 2005, the value of traded berries and mushrooms estimated by Statistics Sweden was €32.4 million (Table 3; see also country report for FRA2010).

In 2000, the amount of marketed wild berries (cloudberry, bilberry and cowberry) was examined by interviewing the five biggest wholesale firms in Sweden as well as

one smaller firm (Jonsson and Uddstål 2002). In addition to the amount reported by these six firms, 1,000 tonnes was added to represent the quantity bought by other companies dealing in wild berries. Thus, the quantity of marketed wild berries totaled at 13,790 tonnes in 2000 (Table 3). The commercial utilization of berries varies from year to year due to various reasons (e.g. crop level) and is assumed to vary from 10,000 to 20,000 tonnes (Jonsson and Uddstål 2002).

In Denmark and Iceland, berry and mushroom picking is quite an insignificant forest use, mainly as a result of the forest structure (Salo 1995; Plum 1998). People who pick berries do it for their own use and commercial collection is very limited (Eysteinnsson, T. and Nord-Larsen, T., personal communication). It seems that the absence of common rights does not stimulate commercial picking in these countries (e.g. Salo 1995; cf. Chap. 1). There are no official statistics on marketed berries and mushrooms in either of these countries, and the estimates provided for SoEF2007 have been set at zero (Table 3).

Lithuania has extensive data on the market supply of wild berries and mushrooms. The data has been collected regularly since 1965 (e.g. SFSS 2008). It is important to note that the quantity estimates presented in SoEF2007 for the year 2005 do not describe the actual situation in 2005, as they were estimated by extrapolating data from 2000 and 2003 (see Lithuanian country report for FRA2005). In Table 3, the actual statistics for this year have also been given (SFSS 2008; see also country report for FRA2010).

For this study, we unsuccessfully tried to contact Lithuania's national correspondents to get additional information to that found in SoEF2007 and the country report (see Tables 2, 3). Therefore, information from *Lithuanian Statistical Yearbook of Forestry* was used. Lithuania's data for SoEF2007 was based on "statistical reports of companies" (SFSS 2008). Bilberries comprised the largest proportion of marketed berries in 2005 (89%), and the remainder were cowberries and cranberries (SFSS 2008). The most important species of mushrooms were chanterelles and ceps (proportions of the total supply were 77 and 17%, respectively).

In Estonia and Latvia, as in the Baltic countries in general, wild berries and mushrooms are collected widely for personal use. These products also have economic importance, providing opportunities to earn additional income (Paal, T. and Silamikele, I., personal communication). The economic significance of these NWFPs has apparently increased during recent years due to the economic recession (Paal, T. and Silamikele, I., personal communication). However, neither Estonia nor Latvia collects statistics on the trade of wild berries and mushrooms and, consequently, there are no estimates in SoEF2007. In the Latvian country report for FRA2010, expert estimations have been presented for the quantity and value of NWFP removals (including berries and mushrooms) but these estimates include both personal and commercial harvests and, therefore, are not included in Table 3.

Paal and Saastamoinen (1998) have presented tentative estimates of marketed berries and mushrooms (both quantity and value) in Estonia for 1994 (Table 3). In their work, domestic market use was divided into industrial and non-industrial parts. The industrial share was estimated on the basis of "scattered data of the utilization of raw material by five main factories dealing in berries and mushrooms, known

capacities of the firms and assumed export of non-processed products” (Paal and Saastamoinen 1998; also Paal, T., personal communication). The non-industrial share included berries and mushrooms purchased by households (Statistics Estonia, Household Surveys), but any other kind of direct trade, e.g. to schools and restaurants, could not be taken into account because of the lack of data. The estimates for marketed berries included bilberries, cowberries and cranberries, while marketed mushrooms were mainly chanterelles. Values were estimated by using average prices paid to pickers in 1994 (Table 3).

In Russia, rural household dependence on wild berries and mushrooms is much greater than, for example, in Finland and Sweden (for further reading, see Richards and Saastamoinen 2010). Before the collapse of the former Soviet Union in 1991, NWFP purchase was centrally organized by enterprises working under the administration of various ministries and departments. The NWFP volumes purchased through this organized harvest were documented in annual statistics. During the 1990s, during the socio-economic transformations taking place in the country, a large number of state enterprises dealing in NWFPs were closed and, consequently, the amount of marketed berries and mushrooms (at least through this organized trade) dropped significantly. It also appears that there was no longer an interest by the state in recording supplies of NWFPs. This development, derived from various sources of information (e.g. Paal 1998; Kukuev 1999; Lukin and Gushchin 1999; Polevshchikova 2005), can also be observed in the figures in Russia’s country report for SoEF2007. According to the report, the quantity of marketed berries and mushrooms was 19,453 tonnes in 1990, 1,230 tonnes in 2000 and only 328 tonnes in 2005. The figures for 2005 (Table 3) and 2000 are clear underestimates as they do not include, e.g., any direct trade. Russia’s correspondents who provided data for SoEF2007 could not be reached, so any clarifications on information found in the country report (see Tables 2, 3) could not be obtained.

Conclusions

The maintenance of balance between harmonization of country statistics and complementing information with country-specific details is a major challenge for international processes. Results from this study reveal that the usability of data on marketed mushrooms and berries varies a lot between European countries, varying at least to some extent along with the significance of NWFPs. No other forest resource parameters (FFRI 2006, Table 12.2; EEA 2006) could be identified as a basis for typology. In general, data provided by European 22 countries for SoEF2007 was found to be incomplete and generally not comparable among countries (Table 2), consequently hindering the use of this information.

There are several explanations for the limitations of data on marketed mushrooms and berries. First, if mushrooms and/or berries are not considered economically important for a country, there is little interest in monitoring their markets, even though some limited commercial picking may occur. Second, due to the cost and difficulty of collecting reliable data on marketed NWFPs, many countries use rough estimates. Third, only a portion of mushrooms and berries reach

well-documented organized markets while another part of the trade is unorganized (e.g. direct trade). The share of the latter component is not included in official statistics of, e.g., Finland and Poland (see Table 2), but can be determined by means of national NWFP surveys, as shown by the Finnish example. Fourth, there may be a lack of or inadequate collaboration between different actors involved, in one way or another, in natural product sectors.

A regional case study of the Nordic and Baltic countries and the Russian Federation indicated that it is possible to find complementary information to data officially provided through the SoEF2007 report, but it is a difficult task to find this scattered information collected by surveys and interviews from households or market operators. In order to improve international statistics, collaboration between country correspondents, national NWFP experts and market operators should be improved. As shown by the Finnish example, survey results can be compiled into balance sheets to control the consistency and derive missing sub-components of trade flows.

In addition to the challenges listed above, the structure and contents of questionnaires, or the survey design in general, affect the usability of data obtained. The reporting form used to collect data on marketed non-wood goods for SoEF2007 only asked for quantitative estimates (quantity and value estimates) and data sources. The reporting form used for data collection for the next State of Europe's Forests³ report (to be published in June 2011) asked for more comprehensive information (enquiry on quantitative indicators available at: <http://timber.unece.org/index.php?id=272>). For example, it included a question on the quality of data sources (using a three-step scale: high, medium, or low) and asked the respondent to identify key species by different non-wood goods categories. Still, essential information, needed to report on markets of different NWFPs is lacking, such as the basis of the value estimate, and coverage of the markets. It is worth considering whether the category "mushrooms and truffles" should be divided into two parts ("mushrooms" and "truffles") and, correspondingly, the category "fruits, berries and edible nuts" into three different parts, including clear definitions for each category (term). Alternatively, the current international product classification systems (e.g. HS) could be utilized but first should be further developed and also simplified. On the other hand, the enquiry should not be too lengthy and complicated, which certainly should be taken into account when further developing the questionnaire for State of Europe's Forests or any other efforts.

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³ Data from countries were collected during spring 2010.

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